

THE INDUSTRY OF THE GREAT SALT LAKE

By Tom Wharton
THE SALT LAKE TRIBUNE

As the sun rises over the Great Salt Lake, a freight train chugs across the Lucin Cutoff, carrying coal to a distant industry.

The skipper of a boat searches for brine shrimp eggs. He comes across a red cluster of millions of eggs and scoops them up for shipment halfway across the world.

A truck driver for a mineral plant dumps a load of gleaming white salt on a mountainous pile near the company's processing plant.

On Stansbury Island, a rancher watches over a herd of cattle.

A hunter sits in a blind at Ogden Bay on the lake's eastern shore. A park ranger prepares to greet tourists at Great Salt Lake State Park. And a sailor launches his craft from a south shore marina.

All these activities take place at the Great Salt Lake, a place many regard as nothing more than a useless dead inland sea. All generate jobs and help pour millions of dollars into Utah's economy.

Just how valuable is industry on the Great Salt Lake?

"It's hard to give a figure of any kind," said Scott Flandro, state sovereign lands coordinator and chairman of the Great Salt Lake Technical Team, an intergovernmental agency charged with monitoring activity in and around the lake.

Some figures, though, can be documented.

Morton International, Akzo Salt of Utah, Magnesium Corporation of America and Great Salt Lake Minerals last year paid \$930,408 in leases and royalties to the Uniform School Fund, used to finance public education.

Great Salt Lake Minerals employs 375 full-time workers and contracts for 100 more. Each of those basic industry jobs creates another 2.7 support jobs.

These mineral industries harvest salt, potassium, magnesium and other minerals out of the lake's brine.

At one time, oil companies thought the land below the lake might possess valuable reserves. Now they are less certain.

"What they found was a tar-heavy oil," said Flandro. "It would be a huge cost to refine so it's not economically feasible at this time. A lot of leases have been dropped."

There are currently 12 brine shrimp egg operators on the lake. The harvests are shipped to markets in the Far East. There the eggs are hatched and the brine shrimp fed to prawns raised for human consumption.

The Division of Wildlife Resources, which regulates the brine-shrimp industry, sold 20 certificates of registration to operators this year, generating \$200,000 for Utah's wildlife programs.

"For each boat and crew a brine shrimp operator sends onto the lake, they need to purchase one certificate," said Kevin Robinette, a native wildlife biologist for the agency. "We used to operate on a royalty system, but now the \$10,000 certificate allows them to harvest as many eggs as possible. The season runs Sept. 5 through March 31."

Harvesting tiny brine shrimp eggs is no small matter. The annu-



Great Salt Lake brine flows in underwater canal to pipes which deliver it to holding ponds for mineral processing.

A YEAR WITH THE

Great Salt Lake

NOV. LEVEL: 4199.7 ABOVE SEA LEVEL

NO CHANGE - OCT.

al harvest runs between 2 million and 12½ million pounds. The companies' combined gross revenues have run as high as \$30 million in a single year.

The railroad's history with the Great Salt Lake dates back to the 1860s when builders of the nation's first transcontinental line struggled to find an acceptable route around the lake.

Randy Kane, the chief ranger at the Golden Spike National Historic Site, said Mormon leader Brigham Young was one of the first investors in the Union Pacific Railroad.

"He lobbied for the railroad to go south of the lake, but the chief engineers thought the land was more stable on the north side," said Kane. "They didn't have the technology or the time to build a bridge across the lake."

When the Union Pacific and Central Pacific lines joined at Promontory north of the lake's shores on May 10, 1869, the American west would never be the same.

"There was no more important single event to the American west in the 19th century than the completion of the first Transcon-

tal Railroad," said Kane. "It took wagons six months to go from the Missouri River to California. Overnight, the train could take people west in four days and seven hours with less effort."

Going around the lake soon proved too costly to the railroads because of the added distance and the difficulty of hauling heavy loads over Promontory Summit. In 1902, the railroads constructed a 12-mile trestle consisting of 28,000 wooden pilings. When the trestle became obsolete after World War II, the federal government and Southern Pacific Railroad replaced it with a causeway requiring 50 million cubic yards of rock, sand and gravel.

The causeway changed the ecology of the lake, creating a saltier north arm not fed by a major freshwater tributary. Differences in the lake's two arms diminished in 1984 when the causeway was breached to relieve flooding caused by a rising lake.

The railway now serves as the main east-west connection for the Southern Pacific Railroad, linking California with eastern markets. Trains traveling the line car-

■ See C-7, Column 1

Lake Industry Produces Salts of the Earth

By Tom Wharton
THE SALT LAKE TRIBUNE

OGDEN — Peter Behrens will mine no brine before its time.

The civil engineer has learned to turn aged Great Salt Lake brine into valuable chemicals used for fertilizers, detergents and industrial purposes.

Because the Great Salt Lake has no outlet, no minerals escape the lake. During an average year, an estimated 2 million tons of nutrients pour into this inland dead sea.

Water is moved from one pond to the next utilizing wooden weirs. Different minerals crystallize at different temperatures under different concentrations. The key to the operation is knowing just when conditions are correct for a particular mineral.

That's why workers take 10,000 samples a month in the company's 19,000 acres of ponds near Bear River Bay on the northeast corner of the Great Salt Lake. Each brine solution must possess just the right concentration of minerals before being harvested.

And, like farming, the harvest often depends on the weather. Too much rain or a strong wind at the wrong time can upset the delicate mineral balance.

No one knows this better than Behrens, who moved from Germany in the mid-1960s with a German consortium to jointly operate Great Salt Lake Minerals, which was then called the Lithium Corporation of America.

The lake was at its historic low and mineral concentrations were high.

"In those days, the Great Salt Lake was the largest known lithium reserve on earth and lithium was an important strategic metal," said Behrens, a civil engineer who developed many of the processes used to extract minerals from the lake. "Now, it's not even listed. We built our pond and plant in 1967. Nothing worked. The Germans lost \$27 million and left. The only remnant of those days is me."

Behrens, using knowledge of engineering, geology, hydrology, geography and chemistry, helped develop many of the processes. Now semi-retired, he serves as vice-chairman of the board.

Developing the unique operation has never been easy.

Just when Behrens thought he had the process of extracting profitable minerals far enough along to be profitable, the lake went from record lows to record highs.

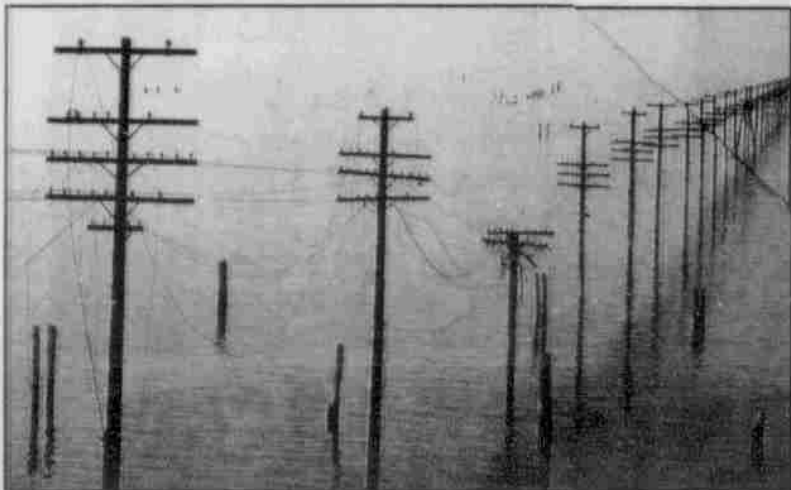
His business was hurt when the state breached the Southern Pacific Railroad causeway in 1984. That diluted the heavy mineral content in the northern arm. Behrens called that a political decision that did nothing to solve flooding.

Finally, as the lake hit record highs, Great Salt Lake Minerals

■ See C-7, Column 1



Heavy equipment moves mountain of washed salt to be marketed.



Utility poles stand in lake adjacent to old railway trestle bridge.

Pumps Went Down With Lake Level, But Are There If Needed Again

By Tom Wharton
THE SALT LAKE TRIBUNE

The West Desert Pumping Station sits inside a huge warehouse on the Hogup Ridge as a monument to the fickle nature of the Great Salt Lake.

Built at a frantic pace starting in June of 1986 to control rising lake waters, the \$55 million project now sits miles from the edge of the lake.

A canal full of salty, turquoise-colored water stretches from both sides of the pumps, giving the illusion the facility is being used. But, like many things in the desert west of the Great Salt Lake, looks are deceiving. The canals simply collect ground water.

Jim Palmer, the chief of design and construction for the Division of Water Resources, engineered the pumps and periodically comes to the remote outpost to check them.

"We went from a super wet cycle to a super dry cycle," he said, snapping his fingers. "The weather changed just like that."

Of course, when the pumps went into operation for the first time in April of 1987, no one could predict the start of a pro-



Jim Palmer stands watch over silent Great Salt Lake pumps. The machinery could be cranked up again if lake level starts rising.

longed drought, especially after two winters of record snowfall.

At that time, the rising waters of the Great Salt Lake threatened two interstate highways, the Salt Lake City International Airport, industrial complexes, some hous-

ing developments and several sewage treatment plants. The lake already had severely damaged the lake's wildlife refuges and recreational facilities and played havoc with mining and brine shrimp operations.

In an amazing flurry of activity, construction crews moved tons of material to create a 4.2-mile outlet canal and a 2.25-mile inlet canal. A 37-mile natural gas pipeline, a 10-mile access road, almost 25 miles of dikes and a 320,000-

acre evaporation pond in the desert west of the Newfoundland Mountains were built.

The pumping project was finally shut down in June of 1989 when

■ See C-7, Column 4